

**George M. Scalise**  
**President, Semiconductor Industry Association**  
**Biographical Information**

George M. Scalise is president of the Semiconductor Industry Association (SIA). He oversees vice presidents and directors in the departments of International Trade & Government Affairs, Technology, Information Systems & Finance, Environmental Safety & Health and Communications and works directly with the **SIA's** Board of Directors. He has a long career in the semiconductor industry and participated in SIA activities for years prior to being named president in June 1997.

Scalise came to the SIA from Apple Computer, where he served as executive vice president of operations. In 1996, he also served as chief **administrative** officer reporting directly to then-Chairman and CEO Dr. Gilbert G. Amelio. As chief administrative officer, Scalise was responsible for developer relations, licensing, human resources, external relations, facilities communications and Apple's legal department.

Prior to that, he held executive management positions at National Semiconductor, Maxtor Corporation, Advanced Micro Devices, Fairchild Semiconductor and Motorola Semiconductor.

A graduate of Purdue University with a Bachelor of Science degree in mechanical engineering, Scalise is a highly respected technology industry spokesperson and carries a special interest and expertise in international trade and competition issues. He was a founding member of the Semiconductor Research Corporation (SRC), an industry-funded organization that provides resources for precompetitive semiconductor research at American universities. He served on its Board of Directors from 1983-87 and as chairman 1984-87. For the period 1992-95 and 1982-87, he served as Chairman of the **SIA's** Public Policy Committee, which helps shape and implement the chip industry's agenda on major policy issues such as foreign trade.

Scalise has served on numerous boards and advisory committees, including SEMATECH, 1993-96, and Cadence Design Systems, **1989-present**. He chaired the Secretary of Energy Advisory Board, U.S. Department of Energy, from 1993-95. And he has been a member of the board of directors for Tower Semiconductor, Ltd.; Maxtor Corporation; Microelectronics & Computer Technology Corporation and the American Electronics Association. He is also a member of the Joint High-Level Advisory Panel of the United States-Israel Science and Technology Commission, **1993-present**; the Leavey School of Business Board at University of Santa Clara; the Engineering Board of Councilors at University of Southern California; the Engineering Foundation Advisory Committee at University of Texas in Austin and the Bay Area Economic Forum.

**Trade Deficit Review Commission  
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**George Scalise  
President, Semiconductor Industry Association**

Thank you, Commissioner Krueger. I'm George Scalise, President of the Semiconductor Industry Association (SIA). I am pleased to provide our input to the Trade Deficit Review Commission.

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The semiconductor industry is a major exporter and international trade is a fundamental component of our success. The SIA is actively involved in international trade issues and has a long history of working within industry and with the U.S. and foreign governments to pursue trade policies that promote U.S. semiconductor exports. We believe that the way to effectively deal with the U.S. trade deficit is to focus on increasing American exports, maintaining open markets and pursuing trade policies that promote the international competitiveness of American industry.

## **INDUSTRY OVERVIEW**

I would like to take a minute to provide some background on the U.S. semiconductor industry and outline the stakes for this industry in international trade. The U.S. semiconductor industry is now America's largest manufacturing industry, contributing 20 percent more to the U.S. GDP than the next leading industry. U.S. semiconductor makers employ about 276,000 people nationwide, and the presence of the industry is widespread -- 35 states have direct semiconductor industry employment. And these are high paying jobs. The average wage in the semiconductor industry is approximately \$55,000, nearly twice the average of private industry overall.

Semiconductors are an increasingly pervasive aspect of everyday life, enabling everything from computers to cell phones to modern defense systems to the Internet which is, in fact, a world wide web of silicon chips. They have sparked the growth of the U.S. electronics industry, which provides employment for 4.8 million Americans in all 50 states.

Behind this enormous economic success is the ever shrinking transistor. A transistor is an electronic circuit, which is the basic building block for an electronic system. A decade ago, we were able to integrate thousands of transistors on a single chip. By steadily shrinking the size of the transistor, we now place millions of transistors on a single chip.

The industry has succeeded in doubling the number of transistors per chip every eighteen months over the last several decades -- a phenomenon known in the industry as "Moore's Law." These technological increases result in steady price declines for chip capability.

The implications of Moore's law and decreasing prices cannot be overstated. The Commerce Department tracks the revenues our industry collects. However a future historian looking back at this century might instead focus on the revenues we do not collect - that is the effect of the rapid and constant price decline of the transistor. Economist Kenneth Flamm has concluded that the impact of chip price declines has had from two to five times the impact on the U.S. economy that the railroad had during a comparable period during the last century.

Worldwide, the semiconductor industry's revenues grow about 15% per year, but its output in transistors increases from 40 to 80% per year. Today the world consumes about 17 million transistors per person, a tenfold increase over the amount consumed five years ago. That is a lot of computing power.

Moore's law has become the axiom of the information age. It will continue to make microchips more affordable, allowing additional millions around the globe to enjoy the benefits that many Americans take for granted -- such as email and access to the Internet. And in America, microchip advances will transform our economy into one where ecommerce is the norm.

## INTERNATIONAL TRADE IS CRITICAL TO THE SEMICONDUCTOR INDUSTRY

With this background, I would like to turn to the topic that brings us here today -- international trade. International trade is tremendously important to the semiconductor industry. Over half of all U.S. semiconductor companies' sales are sold outside of the U.S. markets. Of the total for 1998, 25% of U.S. semiconductor company sales went to Europe, 20% to the Asia/Pacific and 9% to Japan.

I should note that when I refer to U.S. company sales, I am referring to sales by companies headquartered in the U.S., regardless of the actual place of production. U.S. companies typically do their R&D in the U.S., fabricate circuits on silicon wafers in the U.S., and then cut the wafer into individual chips, and package and test the chips in Southeast Asia. The finished semiconductors are then shipped directly to customers around the world.

This means that if U.S. firms increase their sales as a result of a policy to lower tariffs in China, it could register in the trade statistics as increased U.S. exports of wafers to Malaysia, and increased exports of finished semiconductors from Malaysia to China. It also means that when U.S. production of wafers increases, U.S. exports of wafers to Malaysia increase, and U.S. imports of finished semiconductors increase -- which increases the U.S. trade deficit in semiconductors with Malaysia. In this case, the increase of our trade deficit is a sign of success as it results from the increase of domestic wafer production.

Given these paradoxes with official trade statistics, SIA focuses on increasing the market share of U.S. based companies in the various regions of the world rather than merely the exports of finished semiconductors. Increased U.S. share creates U.S. jobs in R&D and wafer fabrication, the highest value-added part of the production process, even though the trade figures do not always reflect this growth.

Last year, the U.S. share was 53% of the global market, reflecting sales of \$67 billion in an \$122 billion world market. This recent success represents a significant comeback from a decade ago. A number of countries around the world have targeted semiconductors as an industry in which they must participate. The United States lost its worldwide market share lead to Japan in 1986, and by 1988 had fallen close to 12 percentage points behind Japan. In 1993, the United States was able to regain the lead, and widen the lead in the late 1990's.

International trade is also a key driver of continued growth for the industry. The recent industry forecast completed by SIA indicates that the international market will grow significantly in the next several years. For example, the size of the Asia/Pacific semiconductor market will more than double from \$29 billion in 1998 to an estimated \$61 billion by 2002.

## **TRADE POLICIES**

The SIA has a number of recommendations on trade policies to improve America's international competitiveness and increase exports. There are a few issues in which we have a particular interest as the United States prepares to host the upcoming World Trade Organization (WTO) negotiations in Seattle at the end of this month.

### **Information Technology Agreement**

The SIA believes that a central element of any new WTO round of negotiations must be continued attention to industrial tariff elimination by WTO members. The U.S. semiconductor industry has been at the forefront of efforts to eliminate tariffs on semiconductors and related products worldwide. In 1997, the multilateral Information Technology Agreement (ITA) was negotiated in which signatories agreed to eliminate their tariffs on semiconductors, semiconductor manufacturing equipment, computers, software and telecommunications equipment.

While the United States has been successful in encouraging many countries to join this agreement, increased participation in the ITA remains a priority. The SIA urges the United States to encourage all WTO member countries to join the ITA as soon as possible. ITA participation remains very limited in certain regions of the world. In Latin America, for example, only three countries – Costa Rica, El Salvador and Panama – are currently ITA signatories.

In addition, the United States should require countries negotiating for WTO accession to follow the lead of Taiwan and to join the ITA as an interim measure as their

accession negotiations continue. China, for example, has taken significant steps toward joining the ITA, and every effort should be made to encourage China to continue to move forward in this positive manner.

A clear goal for the end of any new WTO negotiations should be to make ITA participation mandatory for all WTO member countries. Elimination of semiconductor tariffs will allow U.S. producers to sell advanced semiconductors to their foreign customers at the lowest possible price, thereby increasing U.S. exports for our industry.

## **Electronic Commerce**

Another important tariff issue that will be addressed in Seattle concerns the treatment of electronic commerce. This area presents tremendous opportunities for the semiconductor industry. The SIA supports U.S. efforts to urge WTO members to continue the current practice with respect to tariff treatment of electronic-commerce. Currently, no WTO member considers electronic transmissions as importations and, consequently, no member imposes customs duties on those transmissions. Given the increasing importance of electronic commerce over the Internet, SIA believes that the United States should continue its leadership in this area, and – in addition to encouraging permanent implementation of duty-free treatment – should urge WTO members to commit to tax-free treatment of electronic transmissions.

## **Antidumping**

In addition to these tariff issues, I would like to mention one item that has been proposed for the Seattle WTO agenda that is of particular concern to SIA. Some WTO members have called for antidumping to be included in the new negotiations. All the proposals currently before the WTO with respect to antidumping call for significantly weakening the ability of industries, both in the United States and abroad, to use their national antidumping laws to offset the injurious and unfair trade practices of other countries.

This issue is important to the semiconductor industry because of the history of injurious dumping in our sector. In the mid-1980's, Japanese dumping of DRAMs drove nine of eleven U.S. semiconductor producers out of this segment of the market; one company was driven out of business altogether. U.S. chip makers are the most competitive in the world – when competing against those who adhere to normal market practices. Without the protections provided by the antidumping law, our industry would not be the world leader it is today.

## **Competition Policy**

There are a number of countries seeking to add competition policy to the agenda for the new WTO round. This seemingly innocuous proposal raises serious concerns because prior discussions on trade and competition policy have been used by some countries to attack the antidumping law. This is likely to happen again. In addition, a competition

policy negotiation could be used by other countries to weaken intellectual property obligations or to create new rules that allow countries to regulate U.S. companies that have a strong position in a particular industry. This affects not just semiconductor companies, but any company with a brand name or global reach.

Most of the competition policy discussion so far has been grounded in theory rather than in a factual examination of the specific barriers to international trade and investments that need to be remedied. Before attempting new international disciplines, it is necessary to understand the dimensions of the problems posed for trade by the absence of competition rules and/or their enforcement in so many markets around the world. SIA believes that the issue of competition policy is not sufficiently developed to be included in the new WTO round and that it should not be used as a mechanism to weaken existing agreements on antidumping and intellectual property.

### **Foreign Sales Corporation**

The European Union has challenged and a WTO panel has ruled against the U.S. foreign sales corporation (FSC) statute. The FSC is designed to provide U.S. companies with tax benefits similar to those granted to European companies from the VAT rebate on exports from Europe. It is essential to preserve the FSC to promote U.S. exports. The U.S. Trade Representative is appealing the WTO FSC panel decision. The United States must ensure that FSC benefits are continued.

### **China's WTO Accession**

Another key trade issue for the semiconductor industry, and one that is related to the upcoming trade negotiations, is China's accession to the WTO. China is projected to grow significantly over the next few years as a destination for U.S. semiconductor exports. Some industry analysts expect China to be the third largest semiconductor market in the world, ahead of Germany and behind the U.S. and Japan, as early as 2001 and the second largest market by 2010. The estimated growth rates for the semiconductors, telecommunications and computer markets in China range from 20% to 40% per year for the next fifteen years.

The SIA continues to support China's bid to join the WTO, but only if that accession is accomplished on a commercially viable basis. The WTO accession negotiations provide the best means to obtain the fundamental structural reforms in China's economic and trade system necessary to ensure effective market access for foreign goods in China and exports of semiconductors from the United States.

The SIA has very specific objectives that must be included in China's accession agreement. These objectives are:

- the elimination of semiconductor tariffs;
- the establishment of trading and distribution rights;

- the requirement for state-invested and state-owned enterprises to base purchasing decisions on commercial considerations;
- the elimination of investment restrictions and technology transfer requirements,
- the immediate implementation of intellectual property protections; and,
- the continued application of U.S. non-market economy antidumping methodology.

While most of these issues were successfully addressed in the proposed U.S.-China agreement terms released by the U.S. Trade Representative in April, some Chinese officials have since repudiated that document and it remains unclear to what extent the Chinese have agreed to SIA's priority issues. At least one open issue is the duration in which U.S. non-market economy antidumping law would continue to be applied to China. SIA believes that the current U.S. methodology should be applied to China until a time when the Chinese industry is truly market-driven. This is an important issue for the semiconductor industry given the level of state involvement in the Chinese electronics industry and the history of antidumping in our sector.

## **Export Controls**

Moving from these multilateral trade issues, there is one very specific area of trade policy within the United States that has tremendous implications for the semiconductor industry. Export controls are imposed by the United States Government on a variety of military and dual-use items. The SIA believes that export controls should focus only on those products that are worthy of and susceptible to effective control. For instance, products that are sold in high volumes and through multiple distribution channels generally should not be controlled. Overall, SIA supports an export control policy that narrowly targets only those products that are of true national security concern.

We have been pleased to work with both the Congress and the Administration on devising a "mass market" approach that would provide for license-free exports for chips and other products that are produced in large quantities and are made widely-available. On a separate issue, we are encouraged by the Administration's recent announcement regarding the decontrol of certain encryption exports. SIA has supported the SAFE Act in Congress to liberalize encryption policy and we are now working with the Administration as they craft regulations to implement the changes announced in the new policy.

## **DOMESTIC POLICIES**

There are a few other public policies that I would like to briefly mention. While these policies are more domestically focused, they have an impact on the strength of our companies and their ability to compete internationally, thereby affecting trade flows for the industry.

### **H-1B Visas**

U.S. companies give a high priority to our workforce. This is demonstrated by our efforts to train current employees and to support America's education system, which trains

future employees. U.S. companies annually spend an estimated \$210 billion on training their workforce and donate over \$4 billion per year to U.S. schools at the K-12, co-unity college and university levels. These efforts are complemented by aggressive industry investments to train current workers. It is not uncommon for semiconductor companies to require their employees to take 40 hours or more of training per year. This training occurs on company time and at company expense.

But despite our efforts to educate and train the American workforce, serious shortages remain in key skill areas. Overall job growth in the industry, coupled with a decline in the number of U.S. students majoring in fields such as engineering and computer science, has led to an increasing need for skilled foreign nationals, many of whom are trained at U.S. universities. In fact, non-U.S. citizens now represent over half of the PhD's graduating from U.S. universities in semiconductor fields.

To have access to the foreign talent graduating from America's universities, U.S. companies must apply for H-1B visas for their foreign professional workers. However, the caps on the number of H-1B visas have been reached prior to the end of the fiscal year for the last several years. This trend continues despite a recent, temporary increase in the number of available H-1B visas from 65,000 to 115,000. The backlog of visas for fiscal year 2000 is estimated to be between 40,000 and 80,000, which means the cap could be hit within the next few months although the fiscal year does not end until next fall. While the semiconductor industry uses not more than 5000 H-1B visas per year, delays in hiring the best workers present enormous challenges to our industry and affects our ability to compete in international markets. The current system also creates a foreign competitive advantage and provides an incentive for companies to locate production offshore.

For these reasons, the SIA is supportive of current legislative proposals to address legal immigration. These proposals include adjusting the visa caps and creating a "T" or "Tech" visa specifically for the high-technology workforce. It is truly the creativity, ingenuity and skills of our workforce that make the U.S. semiconductor industry the best in the world. To remain on top, we must have access to the best and brightest workers, whether U.S. or foreign born.

### **Tax Policy – Depreciation**

Another important domestic policy affecting our international competitiveness is the depreciation tax policy for semiconductor manufacturing equipment. Although the economic life of semiconductor manufacturing equipment is three years, current U.S. tax law calls for five year cost recovery. Our industry competitors in Japan, Korea and Taiwan enjoy substantially more favorable tax treatment than we do. Japanese law allows for depreciation of up to 88 percent for chip equipment in the first year; Korea depreciates the equipment over four years with special benefits that permit additional accelerated methods or write-downs. Taiwan allows three-year straight line depreciation, but more importantly, also grants tax holidays which makes the depreciation rate a moot point.



Current tax law not only puts U.S. semiconductor makers at a severe disadvantage with respect to their foreign competitors, it also makes the U.S. a less attractive investment location for the new, multibillion dollar manufacturing facilities the industry will be constructing in the next few years. SIA estimates that a state in this country seeking to attract a \$2.5 billion chip plant faces a \$45 million handicap due to the U.S. depreciation laws even before the chip maker considers other factors such as workforce and infrastructure. (The \$45 million represents a Net Present Value of the imputed interest earned on the difference in the cash flow resulting from a five year depreciation schedule rather than three year.)

The semiconductor industry will shortly go through a once a decade change in wafer size, moving from manufacturing chips on 206 mm (8") diameter wafers to 300 mm (12") wafers. This shift increases the area of the wafer by 2.25 times – from the size of a salad platter to the size of a medium pizza – allowing manufacturers to produce more chips per wafer, thereby greatly reducing costs. If a U.S. firm builds a 300 mm wafer fabrication plants offshore rather than in the U.S., U.S. exports will decline and the trade deficit increases. If a foreign firm can be encouraged to locate a 300mm plant in the U.S., domestic production replaces imports and the U.S. trade deficit decreases.

### **Federal R&D Funding**

The final area that I would like to cover today is investment in research and development. Both government and industry have a role to play in this area. The U.S. semiconductor industry invested \$9 billion – 9 percent of sales – on R&D in 1998, but these funds were not generally aimed at the pre-competitive technologies that will be needed a decade from now. The semiconductor industry has initiated a \$60 million long-range program to focus university research at some of the fundamental challenges facing the industry's ability to continue to produce more powerful chips. This program, and the \$30 million that the industry has been investing each year over the past 15 years in universities through the Semiconductor Research Corporation, depends on a strong university science infrastructure, a base which is receiving less federal funding than historic levels.

The federal government's investment in science and engineering research has been shrinking for decades. In 1965, 5.7 percent of the federal budget was spent on non-defense R&D. By 1998, that investment dropped two-thirds to only 1.9 percent. Overseas, meanwhile, U.S. economic competitors are investing heavily in new research.

In an effort to address this issue, SIA strongly supports the Federal Research Investment Act. This legislation would reverse the downward trend in the percentage of the federal budget allocated to pre-competitive science and engineering research by doubling the authorized spending for this area over the next eleven years. With at least half of the total growth in the U.S. economy since the end of World War II attributable to scientific and technological innovation, the research done at universities and other publicly funded facilities provides a crucial base upon which private industry can build – further

driving economic growth and improving the international competitiveness of the U.S. semiconductor industry.

## CONCLUSION

In summary, SIA urges the Trade Deficit Review Commission to recommend the following:

- That the U.S. set a goal of requiring all WTO member countries to join the Information Technology Agreement by the end of any new WTO negotiations and make a permanent ban on duties and taxes of electronic commerce;
- That the U.S. insist that the new WTO round not reopen the antidumping agreement that was carefully negotiated just a few years ago and not open negotiations on competition policy that would undermine U.S. antidumping and intellectual property laws;
- That China be admitted into the World Trade Organization on commercially viable terms,
- That U.S. export controls be focused only on products that are of national security concern and that are susceptible to effective controls;
- That Congress either adjust the H-1B visa cap or create a new "Tech" visa category to allow U.S. firms to hire the foreign talent graduating from U.S. universities;
- That the U.S. shorten the depreciation period for semiconductor manufacturing equipment to reflect technological obsolescence and attract investment in the U.S. and work to preserve the Foreign Sales Corporation tax benefits that offset the tax rebates the EU receives on its exports; and
- That Congress double federal R&D spending over the next 11 years.

In conclusion, I would like to thank you for the opportunity to be here today. The SIA firmly believes that international trade is a cornerstone to the success of both our industry and the U.S. economy. To the extent that we can work together through a forum such as this to address key trade issues and examine ways to promote the trade competitiveness of American industry, we will all be better off.